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GB 2146002 A

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## (54) Commercial vehicle superstructure de-mounting/re-mounting apparatus

(57) In order to lift and remove superstructure 70 from chassis 80 of a vehicle 50, the vehicle 50 is reversed between spaced apart pairs of rails, forming a first part of the apparatus of the invention, after the superstructure 70 has been detached from the chassis 80, its rear wheels ascending portion 26 of a collapsible ramp raised at an angle to an adjustable floor unit mounted between the rails. Rear support bars 30, forming part of a second part of said apparatus, of the superstructure 70 engage fixed stops 16 on the tops of lifting rails 14a, 14b causing said rails 14a, 14b to rise. Until the rear wheels ride over the top of the ramp portions, 26 the weight of the superstructure 70 is entirely on the chassis 80, whereafter the weight is on the lifting rails 14a, 14b so that the vehicle 50 can be driven away without the superstructure 70. The superstructure 70 can be re-mounted on any vehicle chassis by basically reverse of the procedure as aforesaid.

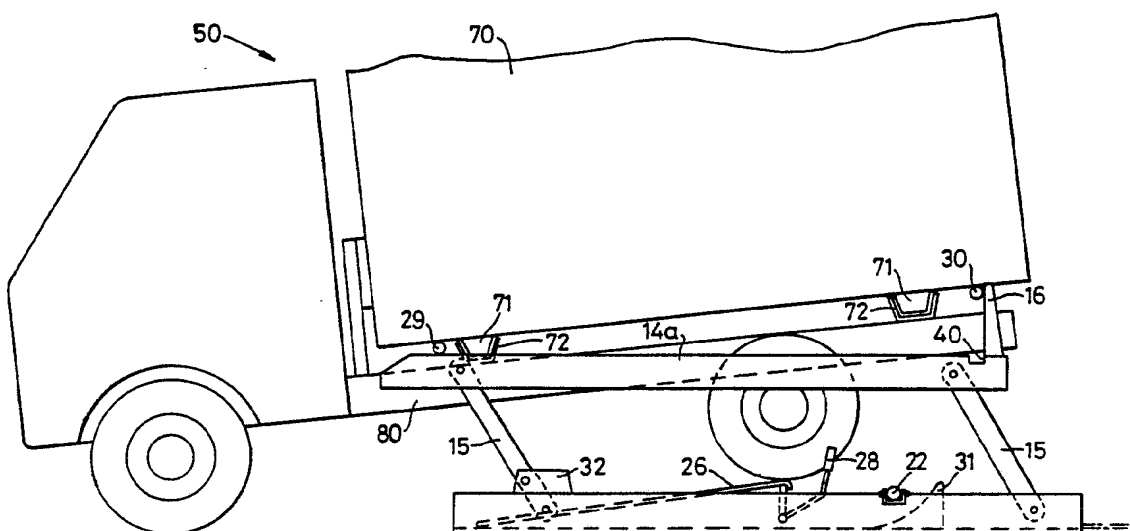
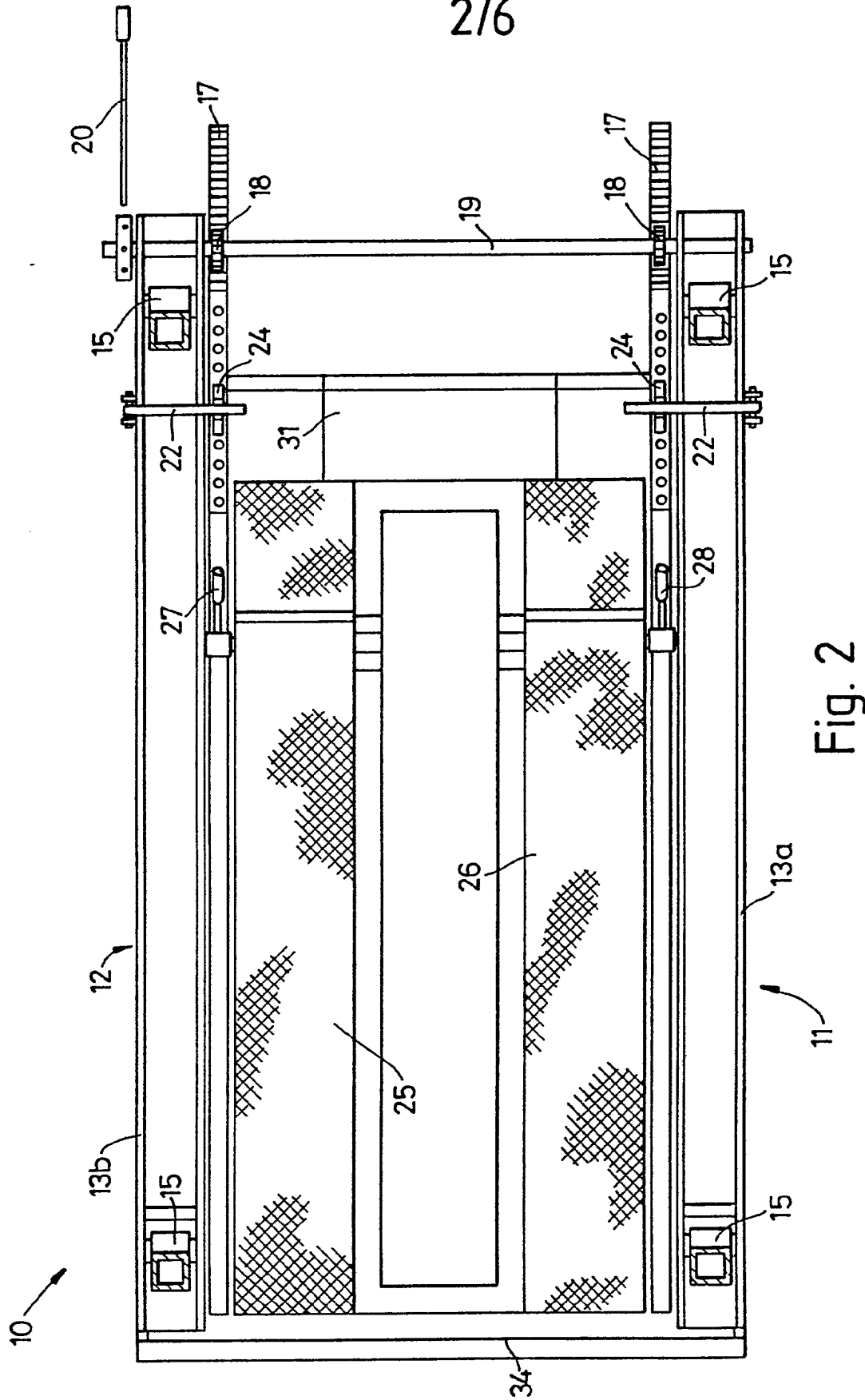


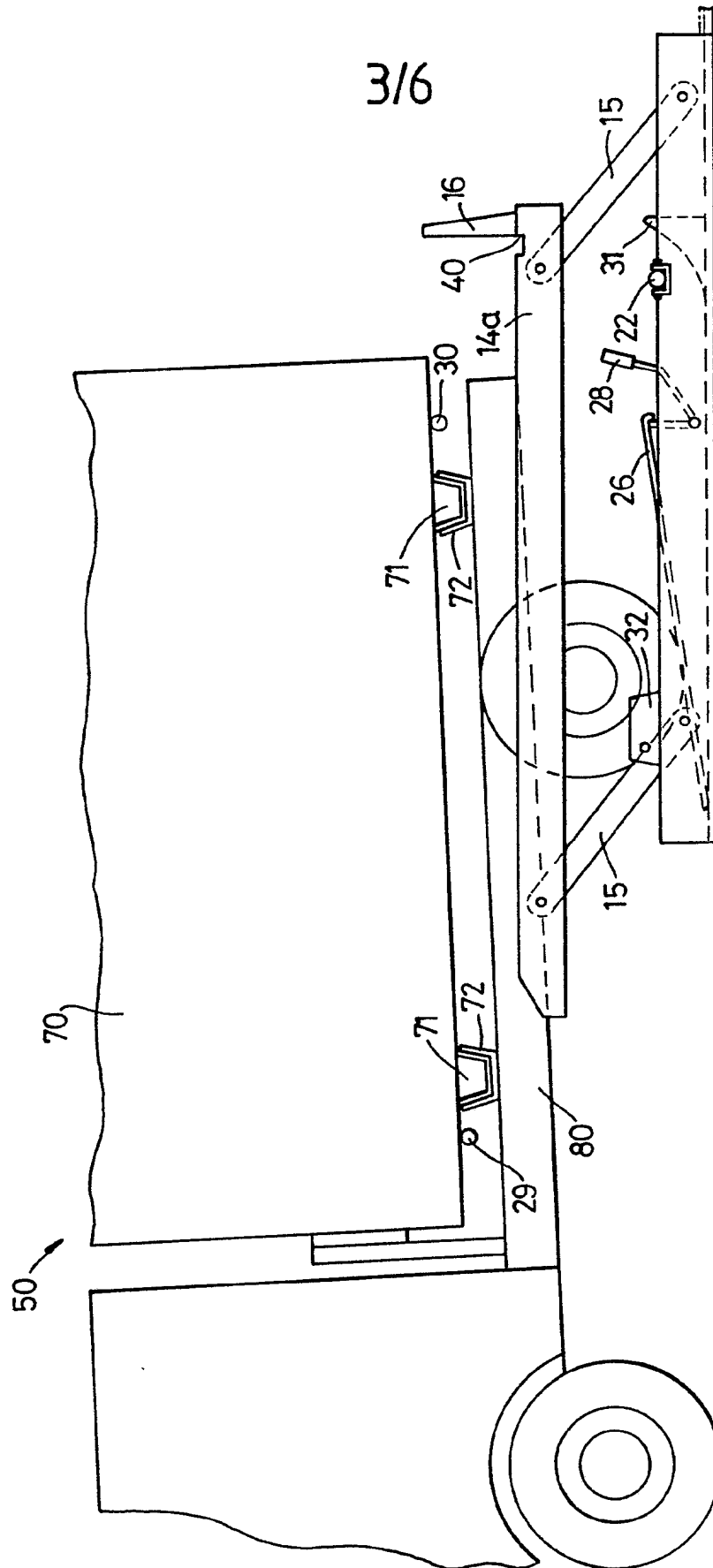
Fig. 5

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.  
The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1982.

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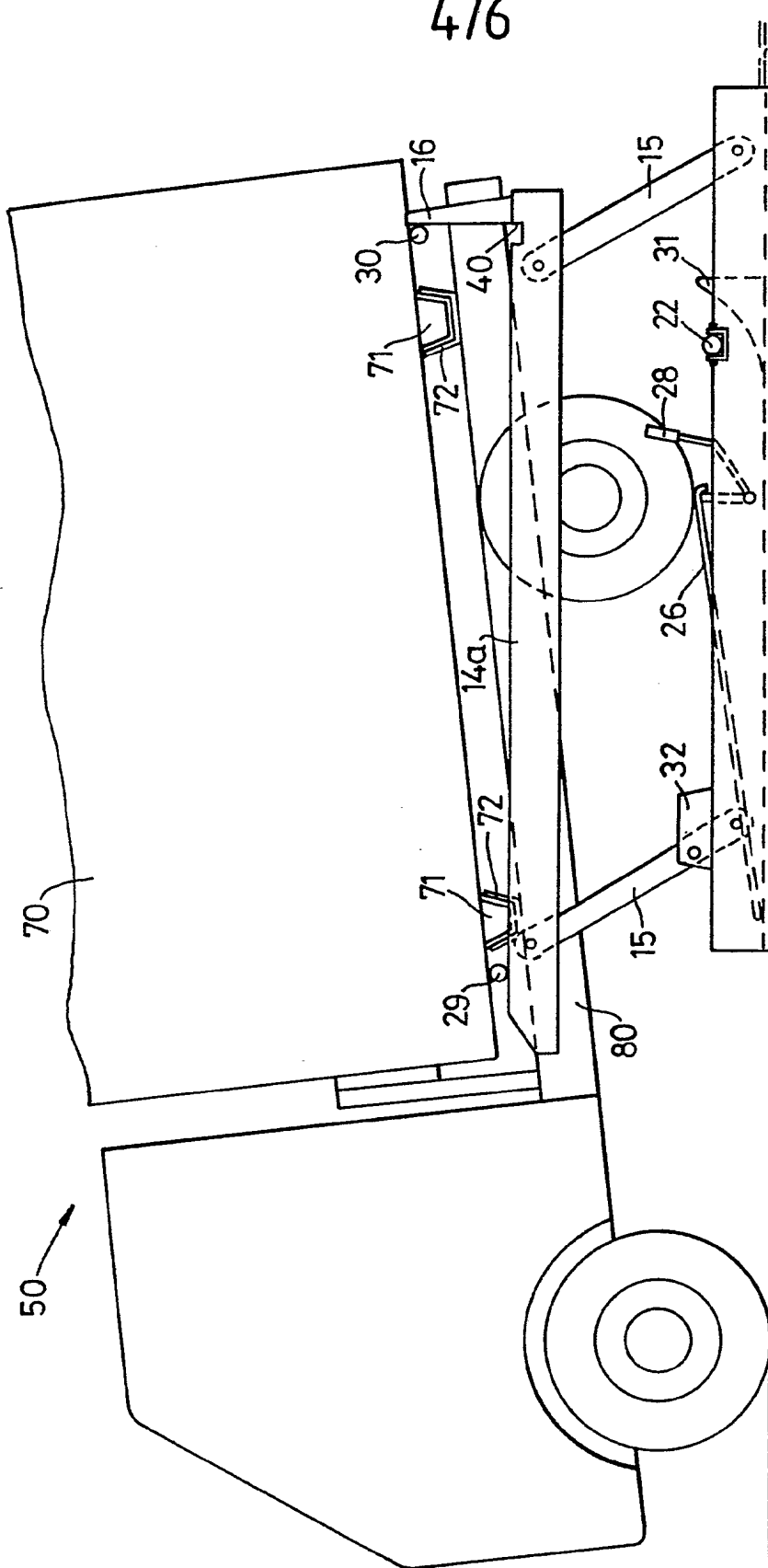


Fig. 5



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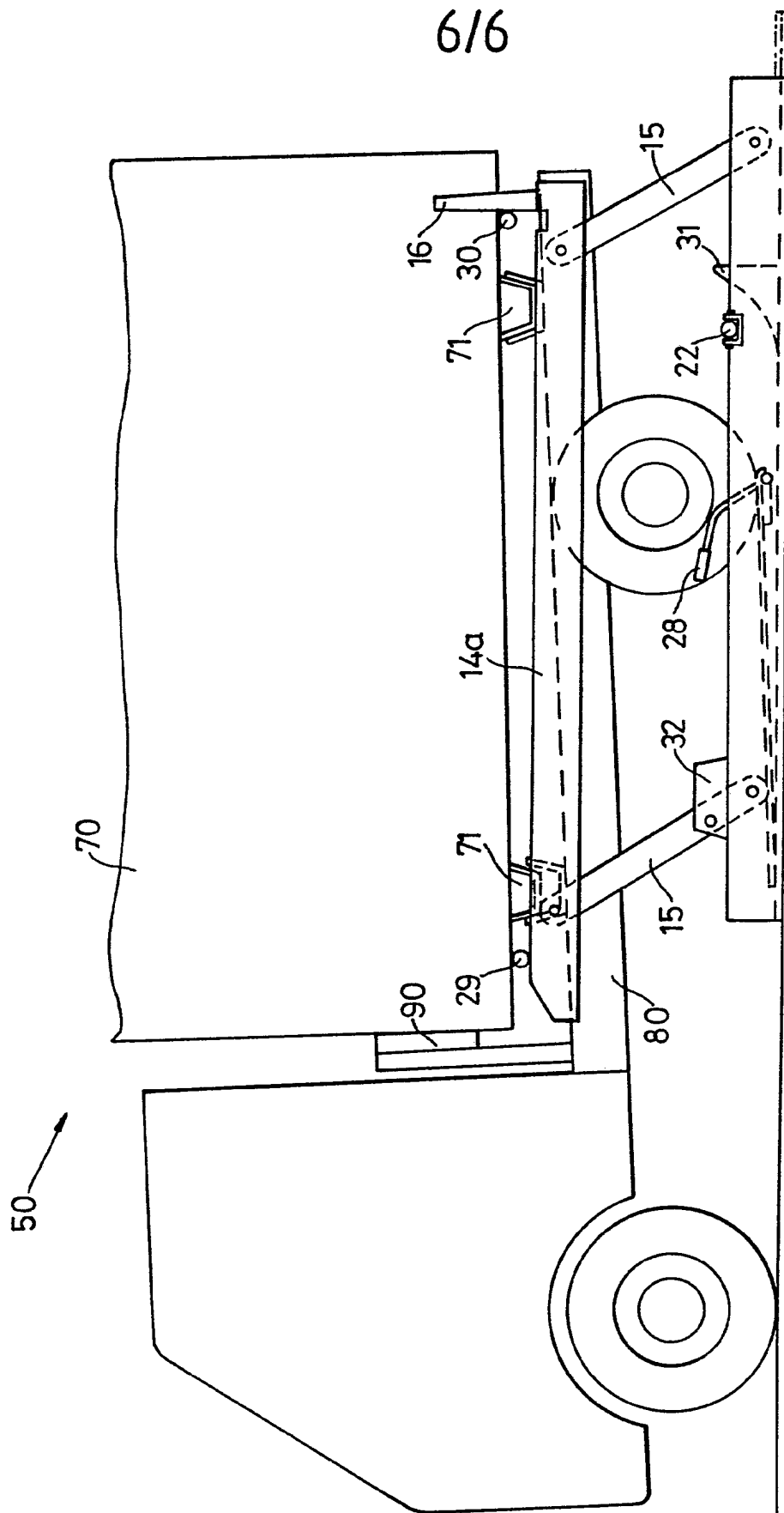


Fig. 7

COMMERCIAL VEHICLE SUPERSTRUCTURE DE-MOUNTING/RE-  
MOUNTING APPARATUS

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This invention concerns apparatus which will permit the superstructures of commercial vehicles, to be de-mounted from the chassis of the vehicle and re-mounted on the chassis of the same vehicle or of a different vehicle.

Such superstructures include skips, box-vans, material spreader bodies, turntable ladders etc. The apparatus of the present invention employs the 'swop-body' principle wherein superstructures can be swapped or interchanged one for another on the same chassis.

The inventor has disclosed such apparatus in his United Kingdom patent no. 2146002. The apparatus of that patent basically comprises two pairs of rails, the pairs of rails being parallel and spaced-apart to accomodate the width of the vehicle. In order to lift the superstructure free of the chassis of the vehicle, the vehicle is reversed between the two pairs of rails after the superstructure has been disconnected from the chassis. Support bars which are extended from both sides of the superstructure engage respective lugs on respective top rails of the pairs of rails and on further rearward movement of the vehicle the top rails



are lifted from bottom rails, to which they are movably connected, and in turn lift the superstructure until the rear wheels of the vehicle meet a stop beam laid on the ground between the pairs of rails when the superstructure will be clear of the chassis. The top rails are then locked securely in place, holding the superstructure, and the chassis can be driven forward clear of the rails. The superstructure can be re-mounted on the chassis of the same vehicle or of a different vehicle by the reverse of the procedure as aforesaid.

The one disadvantage with the apparatus of patent no. 2146002 is that as the superstructure starts to lift away from the chassis the weight on the chassis obviously decreases thus reducing the traction on the driven rear axle of the vehicle. This results in a loss of efficiency.

An object of the present invention is to propose similar apparatus to that disclosed in U.K. patent no. 2146002 but which is so constructed that the full weight of the superstructure continues to be applied to the chassis until full separation of the superstructure from the chassis is achieved thus maintaining full traction on the driven rear axle of the vehicle.

With this object in view the present invention provides apparatus which will permit the superstructures of commercial vehicles to be de-mounted from and re-mounted on the chassis of the vehicles, said apparatus comprising a first part consisting of at least two pairs of rails being parallel with one another and spaced apart at a distance sufficient to enable the vehicle to be reversed therebetween, each said pair consisting of two rails one above the other, the bottom rail being fixed relative to the ground and the top rail serving as the superstructure lifting rail, being movably connected to the bottom rail and being provided with means for engaging a second part of the apparatus, which is on the superstructure, when the vehicle is reversed between the pairs of rails to lift the superstructure by means of the lifting rails clear of the chassis, subsequent lowering of the lifting rails enabling the re-mounting of the superstructure on the same chassis or on a different chassis, characterised by the provision between the spaced apart pairs of rails of a collapsible ramp which can be raised so as to be at an angle to the ground to raise the back end of the reversing vehicle thus maintaining the weight of the superstructure on the chassis as the lifting rails rise.

The invention will be described further, by way of example, with reference to the accompanying drawings in

which:-

Fig. 1 is side elevation of a preferred embodiment of the apparatus of the invention;

Fig. 2 is a plan view of the embodiment of Fig. 1;

Fig. 3 is an enlarged view of part of the preferred embodiment of Figs. 1 and 2; and

Figs. 4 to 7 show the sequence of operations involved in using the preferred embodiment in the de-mounting from and re-mounting on the chassis of the vehicle the vehicle's superstructure.

The preferred embodiment of the apparatus comprises a first part and a second part.

The first part is shown in Figs. 1 and 2 and is denoted generally by the reference numeral 10. It consists of two pairs of rails 11 and 12, spaced apart a distance which is approximately the width of normal commercial vehicle (50-Fig. 4). Each pair of rails 11 and 12 comprise a fixed bottom or ground rail 13a, 13b and a top or lifting rail 14a, 14b.

The lifting rails 14a, 14b are movably connected to respective ground rails 13a, 13b by four interconnecting

arms 15 which are normally set forwardly at an acute angle to the ground rails 13a, 13b.

Both lifting rails 14a, 14b are provided with means for engaging the second part of the apparatus, said means being in the form of a fixed stop 16 upstanding from one end of both lifting rails 14a, 14b.

Between the two pairs of rails 11, 12 is a floor unit 60 which is moveable by means of a rack 17 and pinion 18 adjacent each ground rail 13a, 13b, the two pinions 18 being on a common shaft 19 which is operated by a removable handle 20 from the right hand, rear side of the apparatus.

The floor unit is mounted on respective slide tracks 21 (Fig. 3).

The location of the floor unit 60 relative to the ground rails 13a, 13b is effected by using location pins and moveable cams, one of each on both sides of the apparatus. This arrangement can be seen more clearly in Fig. 3 where the location pin is designated 22 and the removable cam is designated 23. The floor unit 60 has a series of location holes spaced 25mm apart and identified by the letters of the alphabet (for example) - here J to P.

According to the type of vehicle being used, an appropriate location hole is selected and the cam 23 inserted. The floor unit 60 is then moved using the rack and pinion until the location pin 22 rides upon the cam 23 and seats in its recess 24 preventing further movement of the floor unit. Due to the range of location holes a variation in wheelbases of around two feet can be handled. Obviously the extent of the variations can be made greater or lesser as one wishes.

The floor unit 60 also supports a collapsible ramp which consists of two ramp portions 25, 26 which can be raised at an angle by means of respective levers 27, 28. The purpose of the collapsible ramp will be described hereinafter.

The second part of the apparatus of the invention is in the form of support bars 29, 30 located in apertures in the superstructure 70 of the vehicle. The support bars 29, 30 are located so that they extend from both sides of the superstructure 70 beyond the chassis 80. Of course the support bars 29, 30 are only extended upon de-mounting and re-mounting. As an example of body to chassis location, engaging members 71 on the base of the superstructure 70 engage in correspondingly shaped troughs 72 on the chassis 80 and are held securely by twist locks (not shown). Alternative methods for

locating the superstructure on the chassis can be used.

The use of the apparatus of the invention in the de-mounting/re-mounting of the superstructure 70 on the chassis 80 of the vehicle will now be described with particular reference to Figs. 4 to 7.

To uncouple the superstructure 70 from the chassis 80 the twist locks on the chassis are uncoupled. The support bars 29, 30 are inserted into the apertures in the superstructure. Of course the support bars 29, 30 could be fitted integrally to the superstructure requiring only withdrawal to operate.

The ramp portions 25, 26 are raised at an angle to the floor unit 60 using the levers 27, 28.

The vehicle is reversed between the pairs of rails 11, 12 (Fig. 4) and at the same time the rear wheels of the vehicle ascend the ramp portions 25, 26 so that the superstructure remains at rest on the chassis 80.

As the rear wheels ascend the ramp portions 25, 26 the rear support bars 30 engage the fixed stop 16 causing the lifting rails 14a, 14b to rise. Until the rear wheels are right at the top of the ramp portions 25, 26 the weight of the superstructure 70 is entirely

on the chassis 80 (Fig. 5).

The rear wheels eventually ride over the ends of the ramp portions 25, 26 and are stopped by a wheel chock beam 31 (Fig. 6). As this happens the lifting rails 14a, 14b are fully raised and fully support the superstructure 70 with rear support bars 30 in niches 40 to prevent accidental movement of the superstructure on the frame.

To ensure the lifting rails 14a, 14b in their raised position a safety pin is inserted in a safety bracket 32 adjacent each front interconnecting arm 15. Each safety bracket 32 also carries a limiter preventing the arms from going further than 89° from the horizontal.

The ramp portions 25, 26 are then lowered so that the chassis can be driven forward leaving the superstructure on the lifting rails 14a, 14b.

To re-mount the superstructure 70 on a chassis, the chassis is reversed between the pairs of rails over the lowered ramp portions 25, 26 until it is halted by the wheel chock beam 31. At this point the chassis 80 is taking the weight of the superstructure through chassis push brackets 90.

The safety pins are removed from the safety bracket 32 and as the vehicle is driven forward again the lifting rails 14a, 14b gradually descend until the weight of the superstructure 70 is on the chassis 80 (Fig. 7).

When the vehicle is driven clear of the pairs of rails the supports bars are withdrawn and the twist locks engaged so that the vehicle is ready for service.

Of course more than four support bars (29, 30) can be used on heavier superstructures.

A tiebar 34 is fitted across the front of the apparatus to prevent the ground rails 13a, 13b being moved apart by a careless driver.



CLAIMS

1. Apparatus which will permit the superstructures of commercial vehicles to be de-mounted from and re-mounted on the chassis of the vehicles, said apparatus comprising a first part consisting of at least two pairs of rails being parallel with one another and spaced apart at a distance sufficient to enable the vehicle to be reversed therebetween, each said pair consisting of two rails one above the other, the bottom rail being fixed relative to the ground and the top rail serving as the superstructure lifting rail, being movably connected to the bottom rail and being provided with means for engaging a second part of the apparatus, which is on the superstructure, when the vehicle is reversed between the pairs of rails to lift the superstructure by means of the lifting rails clear of the chassis, subsequent lowering of the lifting rails enabling the re-mounting of the superstructure on the same chassis or on a different chassis, characterised by the provision between the spaced apart pairs of rails of a collapsible ramp which can be raised so as to be at an angle to the ground to raise the back end of the reversing vehicle thus maintaining the weight of the superstructure on the chassis as the lifting rails rise.

2. Apparatus as claimed in claim 1 wherein the lifting rails are movably connected to respective ground rails

by four interconnecting arms which are normally set forwardly at an acute angle to the ground rails.

3. Apparatus as claimed in claims 1 and 2 wherein both lifting rails are provided with means for engaging the second part of the apparatus, said means being in the form of a fixed stop upstanding from one end of both lifting rails.

4. Apparatus as claimed in claims 1, 2 or 3 wherein between the two pairs of rails is a floor unit which is moveable by means of a rack and pinion adjacent each ground rail, the two pinions being on a common shaft which is operated by a removable handle from the right hand, rear side of the apparatus.

5. Apparatus as claimed in claim 4 wherein the floor unit is mounted on respective slide tracks.

6. Apparatus as claimed in claims 4 and 5 wherein the location of the floor unit relative to the ground rails is effected by using location pins and moveable cams, one of each on both sides of the apparatus, the floor unit having for the insertion of a respective cam a respective series of location holes spaced 25mm apart and identified for example by the letters of the alphabet.

7. Apparatus as claimed in any preceding claim wherein the collapsible ramp is supported by the floor unit and consists of two ramp portions raisable at an angle with respect to the floor by means of respective levers.

8. Apparatus as claimed in any preceding claim wherein the second part of the apparatus is in the form of support bars located in apertures in the superstructure of the vehicle so as to be extendable from the sides of the superstructure beyond the chassis.

9. Apparatus as claimed in claim 8 wherein the base of the superstructure has engaging members which are engageable in corresponding shaped troughs on the chassis and are held securely by twist locks.

10. Apparatus as claimed in claim 6 wherein a wheel chock beam is disposed in the region of the respective series of location holes so as to extend laterally between the ground rails.

11. Apparatus as claimed in claim 2 wherein two of the four interconnecting arms each have adjacent a safety bracket for the reception of a safety pin when the lifting rails are in their raised position, the safety bracket carrying a limiter which prevents all four interconnecting arms from going further than 89° from

the horizontal.

12. Apparatus substantially as hereinbefore described  
with reference to and as illustrated in the accompanying  
drawings.